

This contract is between the State of North Dakota acting by and through its Industrial Commission, hereafter called Commission, and BOE Midstream, LLC, hereafter called Contractor.

1. Independent Contractor

The Contractor, its employees, agents and representatives are not employees of the Commission. Nothing in this contract shall be deemed to create an employer/employee relationship between the Commission and the Contractor.

2. Scope of Work

a. The Contractor agrees to perform the work described in Exhibit A, entitled "Waterline Crossing Wrap Pilot Project," which is attached to this contract and is made a part of it.

b. Contractor agrees to provide reports for the work mentioned in Paragraph 2a as follows:

Status Report:	June 30, 2015
Status Report:	September 30, 2015
Final Report:	December 31, 2015

The reports shall be in compliance with 5.11 of the Oil and Gas Research Council Policies. Specifically, the Final Report must include a single page project summary describing the purpose of the project, the work accomplished, the project's results, and the potential applications of the project. **Each Report must provide documentation verifying the receipt and expenditure of the private matching funds on the project.** The Final Report and the Project Summary must be submitted in hard copy and either Word 6.0/95 electronic format or Adobe portable document format.

In addition, the deliverables that must be provided in the reports include but are not limited to:

1. Information on the detailed methodology, water sampling results and conclusions;
2. The results of the study shall be submitted as a paper for submission to an appropriate conference or peer-reviewed journal;
3. Test results provided to the State Water Commission and Department of Mineral Resources for their information and analysis.

3. Consideration

a. For performing the work the Commission agrees to grant to Contractor an amount not to exceed \$36,242 according to the following schedule:

Upon execution of the contract	\$ 3,625
Upon receipt and consideration of Status Report	\$14,496
Upon receipt and consideration of Status Report	\$14,496
Upon receipt and consideration of final	\$ 3,625

b. If after reviewing a report the Commission believes that the report is inadequate or that the Contractor is not complying with the scope of work or satisfactorily carrying out the work, the Commission may withhold all or part of a scheduled payment until the Contractor, in the opinion of the Commission, has remedied the deficiency(ies).

4. Authority to Contract and Subcontract

The Contractor shall not have the authority to contract for or on behalf of or incur obligations on behalf of the Commission.

Contractor shall not enter into any subcontracts for any of the work described herein and in Exhibit A without obtaining prior written approval from the Commission. Upon execution of this contract the Industrial Commission approves the Contractor entering into subcontracts with KLJ, Energy and Environmental Research Center of the University of North Dakota and VISCOTAQ.

If the Contractor obtains prior written approval to enter into a subcontract with a qualified provider of services, the Subcontractor shall acknowledge the binding nature of this contract and incorporate this contract together with its attachments as appropriate. The Contractor must agree to be solely responsible for the performance of any Subcontractor.

5. Funds Available and Authorized

Commission certifies at the time of the execution of this contract sufficient funds are available and authorized for expenditure to finance costs of this contract within the Commission's current appropriation or limitation to July 1, 2015. It is agreed that in the event the appropriation or funding to the Commission is not obtained and continued at a level sufficient to allow for payments to the Contractor for the services identified in Paragraph 2, the obligations of each party hereunder terminate upon delivery of written notice to the Contractor.

6. Termination

This contract may be terminated by mutual consent of both parties in writing and delivered by certified mail or in person.

Upon delivery of written notice to the Contractor, the Commission may immediately terminate the whole or any part of this contract if:

- a. The Contractor fails to provide services described herein and in Exhibit A within the time specified herein or any extension thereof; or
- b. The Contractor fails to perform any of the other obligations under this contract, and after receipt of written notice from the Commission, fails to correct such failures within ten days or such longer period as the Commission may authorize.

The rights and remedies of the Commission provided in the above clause related to defaults (including breach of contract) by the Contractor shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract. Any such termination of this contract, other than from breach of contract, shall be without prejudice to any obligations or liabilities of either party already accrued prior to such termination.

If the Commission terminates this contract for default by the Contractor, the Contractor shall immediately reimburse the Commission the amount of all money paid by the Commission to the Contractor hereunder.

7. Contract Management

Notwithstanding the Contractor's responsibility for total management responsibility of the work described herein and in Exhibit A, the administration of the contract will require maximum coordination between the Oil and Gas Research Council, the Commission and the Contractor.

Oil and Gas Research Program Director

The Oil and Gas Research Program Director is designated on authority of the Commission to monitor all technical aspects and assist in administration of the contract. The types of actions within the purview of the Director's authority are to assure that the Contractor performs the technical requirements of the contract, to perform or cause to be performed inspections necessary in connection with the performance of the contract; to maintain both written and oral communications with the Contractor concerning the aspects of the written interpretations of the technical

requirements of the statement of work; to monitor the Contractor's performance under the contract and notify the Commission of any deficiencies observed.

Commission's Authorized Officer

All contractual administration will be carried out by the Commission's Authorized Officer. Communications pertaining to contract administration matters will be addressed to:

The Industrial Commission of North Dakota
Attention: Karlene Fine
State Capitol 14th Floor
600 E Boulevard Ave Dept 405
Bismarck, North Dakota 58505-0840

The Commission's Authorized Officer is the only person authorized to approve changes in any of the requirements under this contract.

8. Access to Records

The Commission, the State Auditor of the State of North Dakota, and the Office of the Attorney General of the State of North Dakota, and their duly authorized representatives, shall have access to the books, documents, papers and records of the Contractor relating to the work performed by the Contractor hereunder for the purpose of auditing, examining and copying the same.

9. Compliance with Law

The Contractor shall comply with all federal, state, and local laws and ordinances applicable to the work to be done under this contract.

10. Indemnity and Insurance

The Contractor shall save and hold harmless the State of North Dakota and the Commission, its officers, agents, employees, and members, from all claims, suits, or actions of whatsoever nature resulting from or arising out of the activities of the Contractor or its subcontractors, agents, or employees under this contract. The Contractor shall obtain liability insurance coverage with limits of liability equal to or greater than those damage limits prescribed in N.D.C.C. §32-12.2-02.

11. Ownership of Work Product, Patent Rights and Fees

All work product, patent rights and fees of the Contractor resulting from this contract shall be governed by Section 6 of the Oil and Gas Research Council Policies.

12. Nondiscrimination

Contractor agrees to comply with all applicable requirements of federal and state civil rights and rehabilitation statutes, rules, and regulations.

13. Applicable Law

This contract shall be governed by and construed in accordance with the laws of the State of North Dakota.

14. Captions

The captions or headings in this contract are for convenience only and in no way define, limit, or describe the scope or intent of any provisions of this contract.

15. Execution and Counterparts

This contract may be executed in several counterparts, each of which shall be an original, all of which shall constitute but one and the same instrument.

16. Amendments

The terms of this contract shall not be waived, altered, modified, supplemented, or amended, in any manner whatsoever, except by written instrument signed by the parties.

17. Notices

All notices, certificates or other communications shall be sufficiently given when delivered or mailed, postage prepaid, to the parties at their respective places of business as set forth below or at a place designated hereafter in writing by the parties.

Industrial Commission of North Dakota
State Capitol, Fourteenth Floor
600 E Boulevard Ave Dept 405
Bismarck, ND 58505-0840

BOE Midstream, LLC
717 17th Street, Suite 1500 1825
Denver, CO 80202
ATTN: MR. JOHN C WADSWORTH

RCW
5/22/11

18. Successors in Interest

The provisions of this contract shall be binding upon and shall inure to the benefit of the parties hereto, and their respective successors and assigns.

19. Attorney Fees

If a lawsuit of any kind is instituted on behalf of the state to collect any payment due under this contract, Contractor agrees to pay such additional sums as the court may adjudge for reasonable attorney fees and to pay all costs and disbursements incurred therein.

20. Severability

The parties agree that if any term or provision of this contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the contract did not contain the particular term or provision held to be invalid.

21. Waiver

The failure of the state to enforce any provisions of this contract shall not constitute a waiver by the state of that or any other provision.

22. Merger Clause

This contract constitutes the entire agreement between the parties. No waiver, consent, modification or change of terms of this contract shall bind either party unless in writing and signed by both parties. Such waiver, consent, modification or change, if made, shall be effective only in the specific instance and for the specific purpose given. There are no understandings, agreements, or representations, oral or written, not specified herein regarding this contract. Contractor, by the signature below of its authorized representative, hereby acknowledges that the Contractor has read this contract, understands it, and agrees to be bound by its terms and conditions.

23. Legal Notice/Disclaimer

The following notice shall be contained in all reports intended to be released to the public:

This report was prepared by BOE Midstream, LLC pursuant to an agreement with the Industrial Commission of North Dakota, which partially funded the report. None of BOE Midstream, LLC or any of its subcontractors, the Industrial Commission of North Dakota or any person acting on behalf of any of them:

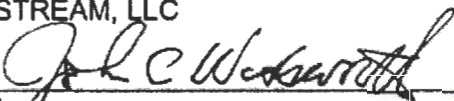
(A) Makes any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately-owned rights; or

(B) Assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method or process disclosed in this report.

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the Industrial Commission of North Dakota. The views and opinions of authors expressed herein do not necessarily state or reflect those of the Industrial Commission of North Dakota.

BOE MIDSTREAM, LLC

By:



Name

COO

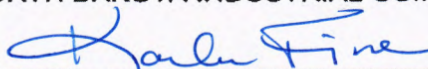
Title

Date:

5-22-15

NORTH DAKOTA INDUSTRIAL COMMISSION

By:



Karlene Fine

Executive Director

Date:

5-22-15

Oil and Gas Research Program

North Dakota

Industrial Commission

Application

**Project Title: Waterline Crossing Wrap Pilot
Project**

Applicant: BOE Midstream, LLC

Principal Investigator: Scott Besmer, KLJ

Date of Application: October 31, 2014

Amount of Request: \$36,242

Total Amount of Proposed Project: \$72,484

Duration of Project: 12 months

**Point of Contact (POC):
John Wadsworth, COO
BOE Midstream, LLC**

**POC Telephone:
316-619-5499**

**POC E-Mail Address:
jwadsworth@boemidstream.com**

**POC Address:
717 17th Street, Suite 1500, Denver, CO 80202**

TABLE OF CONTENTS

Please use this table to fill in the correct corresponding page number.

Abstract	1
Project Description	2
Standards of Success	7
Background/Qualifications	8
Management	9
Timetable	9
Budget	10
Confidential Information	11
Patents/Rights to Technical Data	11

ABSTRACT

Objective: Evaluate the effectiveness of protecting water supply lines from potential crude oil contamination where the pipelines overlap by wrapping the water supply pipelines with VISCOTAQ®PVC Outer Wrap (VISCOTAQ) as an alternative to casing water supply pipelines with polyvinyl chloride (PVC) pipe or casing crude pipeline in steel.

Expected Results: VISCOTAQ will be proven as an effective method to protect water supply pipelines from potential crude oil contamination where water supply pipelines overlap crude oil pipelines.

Duration: January 2015-December 2015.

Total Project Cost: The total project cost is \$72,484. The project will be funded through a cash match from BOE Midstream and KLJ for \$27,076. In-kind contributions total \$9,166. The funding request from the NDIC Oil and Gas Research Council is \$36,242.

Participants: BOE Midstream, KLJ, Energy & Environmental Research Center of the University of North Dakota (EERC), and VISCOTAQ.

PROJECT DESCRIPTION

Objectives: A major concern with the crossing of crude oil pipelines and water supply pipelines is the potential contamination of crude, which could be detrimental to the integrity of the polyvinyl chloride (PVC) pipe used for water supply pipelines. A commonly used method of protection for water supply pipelines is to case the PVC pipe with additional PVC pipe at crude oil pipeline crossing points. However, a study conducted by the South Dakota State University¹ examined the impact of crude oil on the integrity of PVC pipe, high-density polyethylene pipes and casing materials. The results demonstrated exposure of pipe joints from crude oil pipelines resulted in hydrocarbon permeation through the pipe joint gaskets within 5 to 9 weeks of exposure. The study results suggested the casing of PVC pipelines may not provide adequate protection in the event of a crude oil pipeline leak. The study results showed a need for an alternative to protect PVC water supply pipelines.

VISCOTAQ® PVC Outer Wrap (VISCOTAQ), is a self-adhesive wrap designed to provide mechanical and chemical protection of PVC pipelines. VISCOTAQ creates a seal, protecting contact of crude oil with PVC joint gaskets. The EERC Analytical Research Laboratory

VISCOTAQ PVC Outer Wrap



VISCOTAQ PVC Outer Wrap is a Heavy Duty PVC in the form of a roll. The tape is used as an Outer Wrap for the mechanical protection of VISCOTAQ products against soil stress, back fill procedures and other forms of mechanical impact. Moreover it gives a continuous external pressure to the VISCOTAQ corrosion preventive inner material and forces this material, together with eventual soil stress, continuously to flow. VISCOTAQ PVC Outer Wrap is produced from a High Quality PVC with an excellent resistance to chemicals and is wrapped with a 50% overlap onto the VISCOTAQ corrosion preventive coating. The material is applied onto the substrate by hand or by means of a tape wrap machine.

Use and application:

- *As a mechanical outer wrap up to surface temperatures of +85° C/ +185° F*
- *Continuous operating temperature up to 85° C/+185° F*
- *Application temperature > +5° C/+41° F*

¹ DeBoer, D.E., and Julson, D., 2012 Improving safety of crude oil and regional water system pipeline crossings: Final Report to the Pipeline and Hazardous Material Safety Administration, Brookings, South Dakota, South Dakota State University.

(ARL) will conduct lab tests on the performance of VISCOTAQ in preventing the degradation of PVC bell and spigot joint seals.

Methodology: Currently the only two allowed methods of casing crude oil pipelines and water supply pipelines is to 1.) Encase the crude oil pipeline with larger diameter steel pipe for a distance of 20 feet on either side of the crossing. The steel encasing has a high probability of causing corrosion of the crude oil pipeline and then possibly causing a leak. This method is very expensive and disruptive to the environment. 2.) Encase the already in service water supply pipelines. This method requires a new section of waterline that is encased in a fused PVC line to be constructed then “cut-in” to the in-service waterline. Encasing an already in service waterline is very expensive and requires disruption in water service at the time of installation and during the time the air is bled off the system. Bleeding air off the system can take months of work for the water company. The pilot project will verify if encasing a water supply pipeline in VISCOTAQ will protect in-service waterlines without taking the waterline out of service. The integrity of the water supply pipeline will not be compromised by “cutting-in” therefore no air will need to be bled off. The proposed alternative is the most cost effective and least environmentally invasive.

Bench-scale testing

The objective of the bench-scale testing is to determine if and when crude oil permeation occurs within PVC bell and spigot joints commonly used for water supply pipelines in North Dakota and to verify the performance of PVC joints wrapped in VISCOTAQ. A total of six PVC joints will be tested - all will be identical material, but three will be wrapped with VISCOTAQ and three will be unwrapped. In addition, one set of PVC pipe joints (one wrapped and one unwrapped) will be tested with an internal fluid pressure of 45 psi, which is similar to the pressure used in rural water supply pipelines.

Experimental Design

A detailed experimental design for testing of the wrapped and unwrapped PVC joints will be prepared by EERC and provided to KLJ and appropriate regulatory agencies for review. All interested parties will weigh-in on the proposed approach, testing apparatus design, and test conditions before testing begins. For purposes of this funding application, a proposed testing apparatus design and test approach is described below.

Testing Apparatus Assembly

A sealed, rectangular metal vessel will be constructed to simulate exposure of the wrapped and unwrapped PVC to the shallow subsurface conditions that may be encountered adjacent to an oil pipeline leak. The bench-scale experiments will be conducted at room temperature, which is higher than the temperatures expected at the buried pipeline depths. Lower experimental temperatures may be incorporated into the research.

The vessel will be constructed using 14-gauge, 304 stainless steel sheeting that allows for exposure of the PVC joints to Class 2 (or equivalent) sand that is saturated with Bakken crude oil. Representative samples of Bakken crude oil will be provided by KLJ. The ends of the PVC pipes and joints will extend beyond the walls of the vessel to allow for periodic sampling and replacement of the water therein. To properly wrap the PVC joints, a representative from VISCOTAQ will travel to the EERC Laboratory to provide training to ensure proper material placement.

Water Sampling and Analysis

Once the test apparatus is assembled, each PVC pipe will be flushed with the same volume of tap water to remove any residual particulate matter and/or potential contaminants. Tap water will be also be used to fill the pipes for testing to simulate the water quality expected in water supply pipelines. The water

used to fill the pipes initially and following subsequent sampling events will be tested for total organic carbon (TOC) content as a background reference. Samples of water from the pipes will be collected once a week and analyzed for TOC content as a first indicator of hydrocarbon breakthrough. If the water from one of the pipes contains TOC levels above background concentrations, the sample will be also be analyzed for total petroleum hydrocarbons.

Reporting

Upon completion of the project, a final report will be provided to KLJ that documents the final results of the project, including the detailed methodology, water-sampling results, and conclusions. The results of this study will also be submitted as a paper for submission to an appropriate conference or peer-reviewed journal.

Anticipated Results: The pilot project will provide a third alternative that is recognized by the ND State Water Commission for protecting water supply pipelines crossing a crude oil pipeline in North Dakota.

Facilities: The research will be conducted in EERC's ARL. The ARL provides quality data, flexibility, and rapid turnaround time in support of research activities at the EERC. The laboratory is equipped for routine and specialized analyses of inorganic and organic constituents, which are performed using classical wet-chemistry and state-of-the-art instrumental procedures. Established analytical techniques allow for the chemical characterization of a variety of environmental and biological sample types, including fossil fuels. The laboratory will be a controlled environment to simulate a crude oil spill and measure the effectiveness of VISCOTAQ and establish a time frame of the integrity of the product in protecting water supply pipelines from crude oil spill contamination.

The EERC laboratory staff follows U.S. Environmental Protection Agency (EPA), ASTM International, and other standard methods for the analysis of samples. Analytical methods are routinely monitored for

precision and accuracy with certified reference materials from the National Institute of Standards and Technology (NIST), the South African Bureau of Standards (SABS), the International Atomic Energy Agency (IAEA), and other sources.

Resources: VISCOTAQ will provide staff to assist the test efforts at the EERC's ARL to ensure the proper installation of the VISCOTAQ Outer Wrap. VISCOTAQ employees will train EERC researcher on proper installation and handling methods to maintain the integrity of the research findings.

Techniques to Be Used, Their Availability and Capability: EERC will test VISCOTAQ in their Analytical Research Lab. VISCOTAQ is a proven product to protect PVC pipelines, however the product has not been tested in relation to protecting water supply pipelines from crude oil contamination. EERC's is committed to completing the research and reporting the findings. The techniques to be used during the research is detailed in the Methodology section.

Environmental and Economic Impacts while Project is Underway: The pilot project will be tested in the EERC's ARL, therefore there will be no environmental or economic impacts.

Ultimate Technological and Economic Impacts: The Waterline Crossing Wrap Pilot Project will test VISCOTAQ and its effectiveness in protecting water supply pipelines from crude oil contamination. If successful, the wrap will be a non-invasive alternative for private industry oil companies and public water supply entities. The technology will allow water supply pipelines to remain in operation during the installation of the outer wrap. The probability of crude oil pipeline corrosion is not a threat with the wrap and the cost of wrapping the pipeline will decrease significantly.

Oil and gas companies will have a feasible alternative, which according to 2014 USD estimates, the cost to encase a 16-inch crude oil pipeline is \$50,000 and \$20,000 to encase a 12-inch water supply pipeline. The estimated cost to install VISCOTAQ is \$7,000.

The proposed project has the potential to establish North Dakota as a leader in utilizing VISCOTAQ. EERC's research would be the first of its kind conducted to measure the effectiveness of VISCOTAQ protecting water supply pipelines from crude oil contamination. The research could prove valuable to states where pipeline crossings are regulated.

Why the Project is Needed: The proposed project will provide a more economical and less environmentally invasive alternative to enhance the protection of water supply pipelines when crossed with crude oil pipelines. The outer wrap will allow water supply pipelines to remain in-service rather than cutting the pipeline as is current practice, therefore eliminating inconveniences to end water users and threatening the operations of public works and public safety entities.

STANDARDS OF SUCCESS

The overall success of the pilot project will be to have research results verifying VISCOTAQ protects water supply pipelines from potential contamination from crude oil, specifically during the event of a leak in a crude oil pipeline. The pilot project will be of great value to North Dakota as a non-invasive and economical alternative method to protect water supply pipelines. Public water supply entities will not have to disrupt water service to users and the proposed technology will not impact the integrity of the water supply pipeline. The private sector will benefit from an immediate cost savings potential of \$13,000-\$43,000 each time a crude oil pipeline crosses a water supply line by utilizing the new technology.

BACKGROUND/QUALIFICATIONS

Project partners include BOE Midstream, KLJ, EERC and VISCOTAZ.

BOE Midstream is a private midstream company that has committed to infrastructure improvements in North Dakota. The company is investing in the proposed project to find an economical and less invasive alternative to protect water supply lines.

KLJ is involved in almost every component of oil and gas development in North Dakota. Project experience includes design and building of pipelines with numerous crossings, wrapping pipelines, excavation around in-service water supply pipelines and state and federal environmental regulations. KLJ will manage the project timeline and report on the research findings.

EERC is a nationally recognized leader in energy research. EERC will ensure the integrity of the research.

VISCOTAZ is a patented product used for corrosion prevention at pipelines, storage tanks, soil to air transitions, above ground flanges, pipe crossings and in the ditch application. VISCOTAZ staff will travel to the EERC research lab to ensure proper installation of the VISCOTAZ Outer Wrap. VISCOTAZ will also supply the materials.

MANAGEMENT

Scott Besmer, KLJ, will serve as the Principal Investigator/Project Manager of the proposed project. Scott will be responsible for quality control/quality assurance of the research findings. He will be the main point of contact for BOE Midstream, EERC, and VISCOTAQ. During the project kick-off meeting, Scott will verify the established timeline and delivery date is achievable and that the project team understand the reporting benchmark requirements. EERC ARL will supply test results to KLJ. It is anticipated testing will last six months. After the testing is complete, EERC Analytical Research Laboratory will author a white paper of the research.

Scott will be responsible for reporting quarterly updates and the final report to the Oil and Gas Research Councils.

TIMETABLE

Milestones	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Kick-off meeting												
Experimental Design Preparation and Peer Review												
Quarterly Reporting to OGRC												
Material Acquisition and Construction of Testing Apparatus												
Bench-Scale Testing, Recurring Water Sampling and Analysis												
Final Report Preparation												
Present Final Report												

BUDGET

Waterline Crossing Wrap Pilot Project							
Proposed Budget							
Category	Description	Cost Share			In-Kind		Total Cost
		NDIC OGRC	BOE Midstream	KLJ	KLJ	VISCOTAQ	
EERC	Laboratory research to measure the effectiveness of VISCOTAQ outer wrap on PVC water supply pipelines and white paper	\$36,242	\$17,121	\$ 9,955			\$ 63,318
VISCOTAQ	Staff to train EERC researchers and VISCOTAQ supplies					\$2,000	\$ 2,000
KLJ	Project Management				\$7,166		\$ 7,166
Total							\$ 72,484

EERC Research Budget	
Category	Project Total
Labor	\$44,930
Supplies	\$5,280
Other	\$203
Laboratory Fees & Services	
Analytical Research Lab	\$9,824
Graphics Service	\$734
Outside Lab	\$2,400
Total Project Costs	\$63,371

KLJ Project Management Budget	
Category	Project Total
Labor	\$6,300
Travel	\$866
Total Project Costs	\$7,166

CONFIDENTIAL INFORMATION

No confidential information is part of the application.

PATENTS/RIGHTS TO TECHNICAL DATA

No patent or rights issues is part of the application.

STATUS OF ONGOING PROJECTS (IF ANY)

The applicant has not received previous funding from the North Dakota Industrial Commission Oil and Gas Research Council.

Waterline Crossing Wrap Pilot Project BOE Midstream, LLC

January 5, 2015
North Dakota Industrial Commission
Oil and Gas Research Council



Project Team



Example of casing prefabricated waterline section





Example of an
in-service waterline
cut disrupting
service to water
users

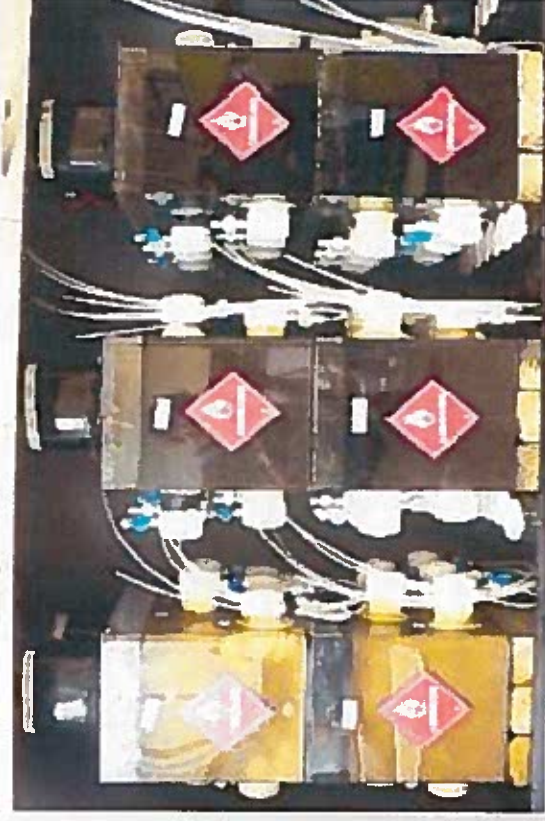


Example of cutting
in a prefabricated
waterline that was
placed back into
service. Air will need
to be bled and could
take months until all
the air is bled off.



Example of
VISCOTAQ wrapping
tape used to encase
existing in-service
waterline. No need to
disrupt service.

Examples of test jigs in laboratory setting





October 31, 2014

Karlene Fine,
Executive Director
North Dakota Industrial Commission
State Capitol-14th Floor
600 East Boulevard Ave Dept 405
Bismarck, ND 58505

Dear Ms. Fine,

On behalf of BOE Midstream please accept this letter as a formal submittal for the North Dakota Industrial Commission Oil and Gas Research Grant for the Waterline Crossing Wrap Pilot Project.

Requested funding will be leveraged with matching dollars for EERC to complete lab tests on the ability of a PVC pipe inner and outer wrap to provide protection where water supply pipelines are crossed by crude oil pipelines. It is anticipated the proposed project will provide a 3rd alternative to the current two methods of crossing waterlines with a crude oil pipeline which will be more economical and less environmentally invasive.

Enclosed is the \$100 application fee and our Oil and Gas Research Grant application. If you have any questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "John Wadsworth".

John Wadsworth, COO
BOE Midstream, LLC
316-619-5944
jwadsworth@boemidstream.com